In the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-15 (cancelled)

16. (new) A valve leaflet for use in a cardiac valve, wherein said valve comprises a frame and at least two flexible leaflets moveable between an open and closed position; wherein the frame comprises an annular portion which, in use, is disposed substantially perpendicular to the blood flow, the frame having first and second ends, one of the ends defining at least two scalloped edge portions separated and defined by at least two posts, wherein said leaflet has first and second lateral edges each attachable to a scalloped edge portion of a corresponding post of the frame, wherein the length of the leaflet between the lateral edges measured at any height (Z) along the lateral edges in an (XY) plane substantially perpendicular to the blood flow is defined by a parabolic function wherein the lengths determined by the parabolic function vary in a substantially linear fashion with the height (Z).

17. (new) A valve leaflet as claimed in claim 16 wherein the parabolic function is defined by

$$Y_z = \left(\frac{4R}{L_z^{2}}\right) x.(L_z - x)$$

wherein Y_z = Y offset at a particular co-ordinate X and Z

R = parabolic maximum

L_z = straight line distance between a first lateral edge for attachment to a corresponding post and a second lateral edge for attachment to second corresponding post at a height Z

x = distance from origin of first corresponding post towards second corresponding post

and the length of the parabola defined by the above is determined by

$$\text{Length} = \int_0^l \sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx$$

18. (new) A cardiac valve prosthesis comprising:

a frame and at least two flexible leaflets as claimed in claim 16;

wherein the frame comprises an annular portion which, in use, is disposed substantially perpendicular to the blood flow, the frame having first and second ends, one of the ends defining at least two scalloped edge portions separated and defined by at least two posts, each leaflet being attached to the frame along a scalloped edge portion and being movable between an open and a closed position,

each of the at least two leaflets having a blood inlet side, a blood outlet side and at least one free edge, the at least two leaflets being in a closed position when fluid pressure is applied to the outlet side such that the at least one free edge of a first leaflet is urged towards the at least one free edge of a second leaflet, and the at least two leaflets being in an open position when fluid pressure is applied to the blood inlet side of the at least two leaflets such that the at least one free edge of the first leaflet is urged away from the at least one free edge of the second or further leaflet.

19. (new) The cardiac valve prosthesis as claimed in claim 18 wherein the parabolic function defining the length of a leaflet in the circumferential direction (XY) between the posts at any position along the longitudinal axis (Z) of a post is defined by

$$Y_z = \left(\frac{4R}{L_z^2}\right)x.(L_z - x)$$

Wherein Y_z = Y offset at a particular co-ordinate X and Z

R = parabolic maximum

L_z = straight line distance between a first post and a second post of the frame at a height Z

x = distance from origin of post towards another post

and the length of the parabola defined by the above is determined by

$$\text{Length} = \int_0^l \sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx$$

20. (new) The cardiac valve prosthesis as claimed in claim 18 comprising three leaflets.

21. (new) The cardiac valve prosthesis as claimed in claim 18 wherein the frame is a collapsible stent.

22. (new) The cardiac valve prosthesis as claimed in claim 18 wherein the length of the free edge of the leaflet is increased relative to the length of the leaflet in an (XY) plane substantially perpendicular to the blood flow by configuring the free edge as a parabolic shape in the height (Z) of the leaflet.

23. (new) The cardiac valve prosthesis as claimed in claim 22 wherein the free edge of the leaflet is trimmed to provide a parabolic shape in the height (Z) of the leaflet such that the maximum depth of the parabola is furthest from the notional midpoint of the untrimmed free edge.

24. (new) A method of manufacturing a cardiac valve prosthesis, the method comprising:

(a) providing a forming element having at least two leaflet-forming surfaces wherein the forming surfaces are such that the length in the circumferential direction (XY) of the leaflet-forming surface is defined by a parabolic function,

(b) engaging the forming element with a frame,

(c) applying a coating over the frame and the engaged forming element, the coating binding to the frame, the coating over the leaflet-forming surfaces forming at least two flexible leaflets, wherein the length of the leaflet between the lateral edges,

measured at any height (Z) along the lateral edges in a (XY) plane substantially perpendicular to the bloodflow, is defined by a parabolic function wherein the lengths determined by the parabolic functions vary in a substantially linear fashion with height (Z)and a surface contour such that, in use, when the first leaflet is in the neutral position an intersection of the first leaflet with at least one plane perpendicular to the blood flow axis forms a wave,

(d) disengaging the frame from the forming element.

25. (new) The method as claimed in claim 24 wherein the valve is a valve according to claim 18.

26. (new) The method as claimed in claim 24 wherein the forming element has three leaflet-forming surfaces.

27. (new) The method as claimed in claim 24 further comprising the step of shaping a free edge of a leaflet.

28. (new) The method according to claim 27 wherein said free edge of the leaflet is shaped to a parabola in the height (Z) of the leaflet.

29. (new) The method according to claim 23 further comprising the steps of:

a) providing a model of a heart valve comprising a frame and at least two flexible leaflets,

b) generating loads experienced by at least one cardiac valve leaflet in use and applying the loads to the model,

c) determining a stress distribution of the leaflet,

d) changing the circumferential length of the leaflet between the lateral edges measured at a height (Z) along the lateral edges in a (XY) plane substantially perpendicular to the blood flow for any position in Z,

e) determining a new stress distribution of the leaflet,

f) repeating steps d) and e) to minimize local stress concentrations in the leaflet to provide a leaflet geometry for use in the manufacture of a cardiac valve.

30. (new) A method as claimed in claim 29 which further includes the step of adjusting the model to account for factors which influence the stress distribution of the leaflet during the cycling of the cardiac valve between an open and closed position.